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Rethinking Territorial Attractiveness in Selected MENA Countries: A Composite Index and Panel Data Perspective

Ouail Chahbouni [1], Fatima Zahra Fekkak [1], Ali Squalli [2], Douaa El Azami Idrissi [2], Ali Bennagem Touati [3], Mounir Benboubker [2] and Mohamed Es-Sanoun [2]

[1] Interdisciplinary Research Laboratory in Economics, Finance and Organization Management (LIREFIMO), Faculty of Legal, Economic and Social Sciences, Sidi Mohamed Ben Abdellah University, Fez 30000, Morocco;
[2] Interdisciplinary Research Laboratory on Economic Dynamics, Finance, and Entrepreneurship (LIRDEFE), Faculty of Legal, Economic and Social Sciences, Sidi Mohamed Ben Abdellah University, Fez 30000, Morocco;
[3] Research Laboratory in Innovation, Economic Policies, and Development, Faculty of Economics and Management, Sultan Moulay Slimane University, Beni Mellal 23000, Morocco.

* **Corresponding author:** Mohamed.essanoun@usmba.ac.ma.

ABSTRACT: This article analyses territorial attractiveness in six selected MENA countries Algeria, Egypt, Jordan, Morocco, Qatar and Tunisia from 2000–2024. It builds a Composite Territorial Attractiveness Index (CTAI) from seven economic, institutional, infrastructural, tourism and environmental indicators and analyses its relationships with trade openness, inflation rate, internet penetration rate, oil rents (as % of GDP) and population using panel-data econometric models. The analysis employs two-way fixed effects with Driscoll–Kraay standard errors and provides robustness checks on the estimation in terms of alternative index constructions, bandwidth sensitivity and first-difference specifications. Perhaps the strongest positive correlate of the CTAI found across all three index constructions and first-difference models is trade openness. CTAI is negatively (and slightly more significant on levels than first-differences) associated with inflation in the main and alternative specifications, Internet penetration and oil rents are not statistically significant whereas the negative population coefficient is sensitive to index construction and econometric specification. The results reaffirm the view of territorial attractiveness as a spatially complex and multidimensional concept, and call to take external integration policies into account alongside reforms by institutions, infrastructure or productive capacity. Owing to the small, unbalanced panel and ambiguous unit-root results, the findings are taken as conditional correlations rather than causal effects or fitted long-run relations.

Keywords: Territorial attractiveness, Multidimensional determinants, Composite index, Panel data, MENA.

I. INTRODUCTION

Because territories compete for investment, economic activity and labour of skilled workers, the notion of territorial attractiveness has gained context in forms of economic development strategies. The enhanced internationalization and adjustment of the production structures have consolidated the role of territories as environments in which firms cooperate, innovate and are embedded within regional and global value chains. What is meant by territorial attractiveness here are the conditions factored into the economic, institutional, infrastructural and environmental basis of where value-generating activities locate and develop [1].

These questions are particularly relevant to the Middle East and North Africa region. Countries naturally have different endowments in natural resources, varying levels of economic diversification, demographic structures that differ on side A' and institutional contexts that differ on side B', along with greater or lesser

integration into the global economy. Countries with different endowment level, as well as infrastructure level, and human capital besides institutional quality these factors can affect attractiveness by a comparison within the region. This set of characteristics has made territorial attractiveness an issue cast in economic diversification, investment and sustainable development policies.

Previous social science literature builds on the increasing recognition of the multidimensional character of territorial attractiveness, with relations among economic, institutional, infrastructural urban and environmental factors. Nevertheless, large part of the approaches concentrates on specific indicators: foreign direct investment or tourism or income per capita. Each gives critical insight, but none on their own provides a complete picture of the conditions underpinning territorial attractiveness. In addition, individual outcome-based assessments rarely recognize the structural heterogeneity of MENA economies which influence the levels and correlates of attractiveness as well. Studying territorial attractiveness and its determinants thus calls for a multidimensional composite indicator combined with panel-data econometric analysis.

Thus, the main research question is: How can a multidimensional approach to measuring territorial attractiveness be constructed for selected MENA countries, what factors are connected with its variations and how economic openness and digital connectivity help over 2000–2024? This study aims to address this question in view of three particular objectives:

- To combine the main components of territorial attractiveness into a single and comparable metric for 6 selected MENA countries (period: 2000–2024) which will be measured using Composite Territorial Attractiveness Index (CTAI).
- To use generalized panel-data econometric methods to estimate the polarities (and magnitude) of conditional relationships between CTAI and some of its independent variables.
- To remain with point path-specific, break down the independent impacts of economic openness and digital connectivity on territorial attractiveness, test their robustness to various specifications and pull out arrangements for strategy in our nations of enthusiasm on.

The empirical analysis is carried out on the economies of Algeria, Egypt, Jordan, Morocco, Qatar and Tunisia over 2000–2024. The sample covers a dichotomy of economics with larger, resource-rich nations at one end and smaller, more open economic environments at the other. This selection creates the opportunity for removing the attractive quality of a region compared to various other contexts however results can not generalize across all MENA area.

This is a methodologically-oriented contribution; policy. Methodologically, it combines a multidimensional composite index with the pooled-country econometric approach to investigate territory attractiveness. From a policy standpoint, it brings out conditional linkages that may inform development policies within the respective MENA countries including but not limited to economic openness and digital interdependence. As the economies analyzed are structurally heterogeneous, this research provides a unified framework for the analysis.

The rest of the article is as follows. Section two is devoted to the literature review and theoretical framework Section III presents methods, which details how CTAI was developed and outlines the econometric strategy. Section 4, Section 5 and Section 6 present the empirical results, robustness checks followed by policy implications & limitations, and summary of how our paper contributes to the literature along with suggestions for future research respectively.

II. LITERATURE REVIEW

Newer studies propose interpreting territorial attractiveness as a multidimensional feature steered by economic, institutional, infrastructural social, environmental and symbolic characteristics instead of only a single variant or comparative advantage [1-3]. This perspective moves the focus away from fixed-factor endowments to attractiveness as an ongoing process of territorial evolution, a process that can be articulated by public policy.

The economic literature underlines (i) the importance of infrastructure, that is to say: transport facilities; (ii) business climate, more specifically weather conditions as well as legislation environment and

government involvement; (iii) production and energy costs combined with human resources and investment-friendly nature of a territory [4, 5]. Thus, broader reviews of business attraction similarly highlight the relative weight of the business environment, institutional arrangements and territorial modernization over fiscal or cost-based incentives alone [6].

In fact, in a recent paper on the MENA region, this macro-financial background is further recognized. Es-Sanoun et al. El Kadri et al. [7] studied through data of MENA economies the nexus between exchange-rate dynamics, inflation and economic growth. [8] document important relationships between financial-sector development and individual welfare in the region. Such findings confirm the importance of macroeconomic and financial context in relation to the host environment influencing territorial attractiveness as a whole. The structuring role of the institutional and governance dimensions Territorial attractiveness is a process that can be facilitated by coordinated public policy, spatial planning, (often collective) governance and cooperation between local actors. In the Moroccan context, studies focused on character networks and proximity as enabling factors for sustainable attraction [9] and recent conceptual work has highlighted public policy, governance, and territorial branding [10].

Another anchoring attractiveness dimension are the territorial marketing and communication. Studies emphasizing the territorial image, marketing and coordinated place-management strategies are among the few which can provide evidence of differentiated visibility of territorial goods at metropolitan and regional levels [11, 12]. Within the case of tourism entrepreneurship and regional development, In Morocco communication and territorial attractiveness has also been studied [13].

Other important components are urban, tourism and residential. In the field of urban technology, studies on urban tourism show that notions of attractiveness are shaped by factors such as public spaces, the environment in which destinations exist, accessibility through transport systems and local services including commercial establishments as well as means of communication [14]. Transport accessibility, food services, and cultural attractions have been identified as significant factors in tourist attractiveness in a study of Tokyo [15]. According to the factor-analysis study in regional branding, transportation and living convenience, tourism and nature, local product (food) supply, history and traditions are the relevant dimensions for effective regional brand [16]. A relational interpretation of attractiveness, featuring intersubjective co-ripening factors and supporting theories from tourism-oriented territorial studies, further develops these ideas [17].

Territorial capital is a powerful way to bring these dimensions together. Territorial capital is a complex combination of material and immaterial assets, such as infrastructure, environmental resources, knowledge and social and institutional networks which are relevant to regional competitiveness (and development) [18]. For example, a composite tourism-performance index developed for the case of Fez as labeled destination illustrates multidimensional measurement at the territorial level [19]. However, attractiveness cannot be an end in itself; rather recent perspectives argue that territorial attractiveness should go hand-in-hand with well-being, quality of life and sustainability [20, 21].

Most commonly identified factors associated with variation in economic and territorial performance, especially in the context of MENA, comprise those related to governance and institutional quality. Findings from panel studies indicate that better institutions, or governance, are correlated with better economic performance as well as higher investment and growth potential [22, 23]. A more general work on governance and complexity further emphasizes the need for coordination [24]. The third dimension is land governance, as populaces of inadequacies in land administration, planning and inter-institutional coordination could in a way hinder urban development and the flourishing of land markets [25].

A key factor to consider is the regulatory and business environment. Examining how business regulation and institutional conditions impact economic growth: Evidence from MENA panel data [26]. More recent evidence also indicates that economic prosperity across the MENA countries is related to competition policy, governance, access to finance, entrepreneurship and regulatory quality [27]. At the sectoral level, research on MENA tourism identifies foreign direct investment and exchange-rate conditions among the factors associated with international tourist arrivals [28]. Related evidence from Morocco shows that real effective

exchange-rate movements, inflation, GDP per capita, and CO_2 emissions are associated with international tourism demand [29].

Digital connectivity merits particular attention because it may influence investment attraction, economic integration, access to information and services, public-service delivery, and tourism. International panel evidence examines the relationships among information and communication technologies, transport infrastructure, foreign direct investment, and economic openness [30]. This literature provides a rationale for testing internet penetration as a correlate of the CTAI in the present study. Although these contributions are valuable, the literature remains fragmented across dimensions and sectors. Relatively few studies combine multidimensional measurement with a macro-panel framework for selected MENA countries. This gap motivates the construction of a composite territorial attractiveness index and the use of panel-data methods to examine its conditional associations with structural and macroeconomic variables, while controlling for country-specific and common time effects.

III. METHODOLOGY AND EMPIRICAL STRATEGY

1. CONSTRUCTION OF THE COMPOSITE TERRITORIAL ATTRACTIVENESS INDEX

The first step of the empirical analysis consists of constructing a Composite Territorial Attractiveness Index (CTAI) to capture the multidimensional nature of territorial attractiveness. Composite indicators are useful for summarizing complex phenomena, provided that indicator selection, normalization, weighting, aggregation, robustness checks, and missing-data treatment are explicitly documented [31].

The study covers six selected MENA countries Algeria, Egypt, Jordan, Morocco, Qatar, and Tunisia over 2000–2024. The sample is not intended to represent the entire MENA region. The countries were selected to capture differences in economic structures, resource dependence, demographic scale, income levels, and external integration. The theoretical panel contains 150 country-year observations. However, missing values for several indicators make the empirical sample unbalanced. The number of observations therefore varies across the index-construction and regression stages.

The CTAI combines seven indicators covering economic, institutional, infrastructural, tourism, and environmental dimensions: political stability (PS), CO_2 emissions (CO_2), foreign direct investment (FDI) inflows, control of corruption (CC), access to electricity, international tourist arrivals (ART), and GDP per capita (GDPpc). FDI is measured as foreign direct investment, net inflows (% of GDP). The data are obtained from the World Bank's World Development Indicators (WDI) and the 2025 revision of the Worldwide Governance Indicators (WGI). For WGI, governance estimates are used rather than the alternative 0–100 scores.

Table 1. Indicators used in the construction of the CTAI.

Component	Source / series code	Unit or measure	Transformation	Direction
Political stability (PS)	WGI 2025, sheet pv; governance estimate	Governance estimate	None before normalization	Positive
CO_2 emissions (CO_2)	WDI: EN.GHG.CO_2.PC.CE.AR5	CO_2 emissions excluding LULUCF, tonnes per capita	None before normalization	Negative
FDI inflows (FDI)	WDI: BX.KLT.DINV.WD.GD.ZS	Net inflows, % of GDP	None before normalization	Positive
Control of corruption (CC)	WGI 2025, sheet cc; governance estimate	Governance estimate	None before normalization	Positive
Access to electricity (ELEC)	WDI: EG.ELC.ACCS.ZS	% of population	None before normalization	Positive

International tourist arrivals (ART)	WDI: ST.INT.ARVL	Number of arrivals	None before normalization	Positive
GDP per capita (GDPpc)	WDI: NY.GDP.PCAP.KD	Constant 2015 US$	None before normalization	Positive

Note: WGI governance estimates are expressed on an approximate −2.5 to +2.5 scale.

The direction assigned to each indicator reflects its interpretation within the composite index. Higher values of positively oriented indicators increase the CTAI, whereas higher CO_2 emissions reduce it. These orientations are methodological choices and should not be interpreted as independently estimated causal effects.

For comparability across indicators expressed in different units, pooled min–max normalization is applied. Let X_{jit} denote the observed value of indicator j for country i in year t. For each indicator, a_j and b_j denote the minimum and maximum observed across the six selected countries over 2000–2024, using all available non-missing observations. The same extrema are applied to every country and year for a given indicator. For positively oriented indicators, the normalized score is:

$$Z_{jit} = \frac{X_{jit} - \min(X_j)}{\max(X_j) - \min(X_j)} \quad (1)$$

For negatively oriented indicators, specifically CO_2 emissions, the normalization is reversed:

$$Z_{jit} = \frac{\max(X_j) - X_{jit}}{\max(X_j) - \min(X_j)} \quad (2)$$

Table 2. Extrema used for pooled min–max normalization.

Component	Minimum	Maximum	Available observations
Political stability	-1.807033	1.325252	144
CO_2 emissions	1.181018	53.599260	150
FDI inflows	-1.685509	23.537290	150
Control of corruption	-1.044396	1.373450	144
Access to electricity	69.800000	100.000000	150
International tourist arrivals	582,000	14,731,000	116
GDP per capita	1957.141357	83533.50	150

The main CTAI is calculated as the equally weighted arithmetic mean of the seven normalized components:

$$CTAI_{it} = \frac{1}{7}\sum_{j=1}^{7} Z_{jit} \quad (3)$$

Equal weighting is used to avoid imposing strong prior assumptions about the relative importance of individual indicators. Missing values are neither replaced with zeros nor imputed. The main CTAI is set to missing whenever at least one of its seven components is unavailable for a country-year observation. This complete-case rule keeps the effective weights constant across observations.

The reconstructed CTAI is available for 111 of the 150 possible country-year observations. To assess sensitivity to index construction, two additional versions are considered: a CTAI excluding FDI (CTAI-FDI) and an alternative dimension-weighted CTAI (CTAI-DW). In the latter, each of the five conceptual dimensions receives a weight of 20%. The economic dimension assigns 10% each to FDI and GDP per capita, and the institutional dimension assigns 10% each to political stability and control of corruption. CO_2 emissions, access to electricity, and international tourist arrivals each receive 20%.

Figure 1 illustrates the evolution of the reconstructed CTAI across the six selected MENA countries over 2000–2024. The figure uses the same normalization and missing-data procedures as the index employed in the econometric analysis. Missing country-year observations are not interpolated.

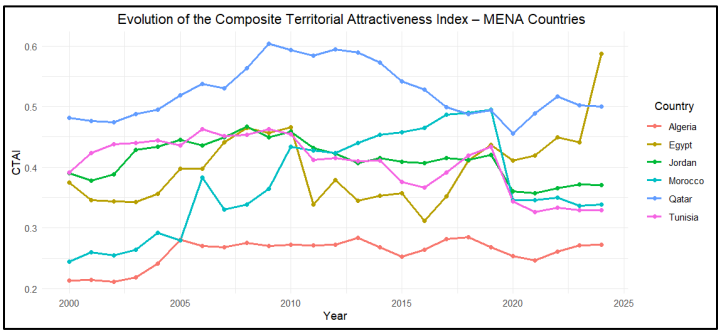

FIGURE 1. Evolution of the composite territorial attractiveness index (CTAI).

Differences in the levels and trajectories of CTAI among the countries chosen for inclusion in this study are illustrated in Figure 1. These differences should be interpreted descriptively since the index is di-rectly related to indicator selection, nor-malization, missing-data rules and weighting. Country rankings are thus treated as supplementary to the robustness checks rather than polar measures of territorial performance.

2. PANEL-DATA FRAMEWORK AND MODEL SPECIFICATION

The dependent variable is the CTAI within a panel-data framework. Your training data goes to October 2023. The main part of the specification connects territorial attractiveness with: trade openness, inflation; internet penetration oil rents - against natural logarithm of population. Data on all other explanatory variables are from the World Development Indicators.

Table 3. Regression variables.

Variable	WDI series code	Unit / transformation
Trade openness (TO)	NE.TRD.GNFS.ZS	Trade, % of GDP
Inflation (INF)	FP.CPI.TOTL.ZG	Consumer prices, annual %
Internet use (INT)	IT.NET.USER.ZS	Individuals using the Internet, % of population
Oil rents (OIL)	NY.GDP.PETR.RT.ZS	% of GDP
Population (LPOP)	SP.POP.TOTL	Natural logarithm of total population

The baseline model is specified as:

$$CTAI_{it} = \alpha_i + \lambda_t + \beta_1 TradeOpen_{it} + \beta_2 Inflation_{it} + \beta_3 Internet_{it} + \beta_4 OilRents_{it} + \beta_5 \ln(Pop_{it}) + \varepsilon_{it} \quad (4)$$

where α_i represents country fixed effects, λ_t represents year fixed effects, and ε_{it} is the idiosyncratic error term. Country fixed effects control for time-invariant country characteristics, while year fixed effects account for shocks common to the countries in the sample.

Standard model-selection tests are used to compare Pooled OLS, fixed-effects (FE), and random-effects (RE) specifications. Pooled specification is rejected by F-test and Breusch–Pagan LM test. Using the Wallace–Hussain random-effects estimator, the conventional Hausman test does not reject the null hypothesis of no systematic difference between FE and RE coefficients. Nevertheless, the two-way fixed-effects model is kept as the main specification from a theoretical perspective since both country-specific factors that do not change over time and common year shocks are part of the problem. This leads to a base case estimate using the usual full-case sample of 98 country-year pair observations.

Residual diagnostics are performed including the Pesaran cross-sectional dependence (CD) test, the Breusch Godfrey/Wooldridge test for serial correlation and the Koenker–Breusch–Pagan test for heteroskedasticity by country. Due to the fact that these diagnostics suggest departures from standard error assumptions, inference is based on Driscoll–Kraay standard errors [32].

The implementation uses an HC1 correction, a time clustering, Bartlett weights, and the baseline bandwidth is six months. Bandwidth The sensitivity is assessed with the help of bandwidth, which is taken from zero to four. Baseline bandwidth treated as a working spec (not an optimally chosen value). Significant limitations are the small cross-sectional dimension (N = 6), the unbalanced panel and the short time span of only eight years in the regression sample. The Driscoll–Kraay covariance estimator allows for some specific types of cross-sectional and temporal dependence but does not overcome endogeneity, measurement error, or spurious-regression issues.

At the first step, panel unit-root properties are studied. There is no common balanced period for the six variables of all six countries at once. For the CTAI, the longest common consecutive window is from 2009 to 2019 and for trade openness that window is preceded by another from 2000–2007. Inference is not based on first generation IPS testing [33] but rather on second-generation, CADF/CIPS-type calculations along the lines of Pesaran [34], allowing for cross-sectional dependence. Because of the limited common time periods and small cross-sectional dimension, evidence is considered inconclusive among (28) the papers published.

The level specification is followed by a first-difference model as a robustness check. No interpolation, differences between contiguous calendar year values by country. The first-difference models were based on a common sample of 87 observations and investigated associations between annual changes. They do not interpret their results as evidence for short-run causality and treat non-significance in first differences as either evidence against or evidence for a long-run relationship.

Finally, the base model is re-estimated or the FDI-excluded CTAI and the alternative dimension-weighted CTAI (to develop a common sample). Collinearity diagnostics for the explanatory variables are performed through variance inflation factors (VIFs) after a two-way within transformation. All coefficients are interpreted in this paper as conditional statistical associations, not causal effects without a credible identification strategy since these are non-experimental estimates.

IV. RESULTS

1. MODEL SELECTION

Table 4. Model-selection tests on the common sample.

Test	Statistic	p-value	Interpretation
F-test: two-way FE vs pooled OLS	F = 6.8574 (24, 68)	0.001	Rejects pooled OLS
Breusch–Pagan LM: two-way effects	χ^2 = 99.4337 (2)	0.001	Rejects absence of random effects
Hausman test: FE vs RE	χ^2 = 0.1781 (5)	0.9993	Does not reject RE consistency

Note: The Hausman test used the Wallace–Hussain two-way random-effects estimator because Swamy–Arora was not estimable with the available sample and regressors.

The model-selection tests indicate that pooled OLS is insufficient. The Hausman test does not reject the null hypothesis of no systematic difference between FE and RE coefficients. Nevertheless, the two-way fixed-effects model is retained as the main specification on substantive grounds, as it controls for time-invariant country characteristics and common year effects.

2. DIAGNOSTIC TESTS AND DRISCOLL-KRAAY IMPLEMENTATION

All three diagnostic tests are significant at the 1% level, indicating that conventional standard errors may be unreliable. Driscoll–Kraay standard errors are therefore reported as the main inference method. Given the

small cross-sectional dimension (N = 6) and the limited time dimension after missing-data restrictions, the resulting inference is interpreted cautiously.

Table 5. Diagnostic tests for the main fixed-effects model.

Diagnostic test	Statistic	p-value	Conclusion
Pesaran CD	-3.1910	0.00142	Cross-sectional independence rejected
Breusch–Godfrey/Wooldridge AR(1)	34.8761	3.51e-09	Null of no serial correlation rejected
Koenker–Breusch–Pagan by country	16.8088	0.00488	Null of homoskedasticity rejected

Note: The diagnostics support robust covariance estimation but do not resolve endogeneity or stationarity concerns.

3. MAIN FIXED-EFFECTS RESULTS AND CTAI ROBUSTNESS

Table 6. Two-way fixed-effects estimates with Driscoll-Kraay standard errors.

Index	Variable	Coeff / significance	SE	95% CI
CTAI	TO	0.001946***	0.000543	[0.000882; 0.003011]
CTAI	INF	-0.002201***	0.000572	[-0.003323; -0.001080]
CTAI	INT	0.000365	0.000536	[-0.000686; 0.001416]
CTAI	OIL	-0.000935	0.001257	[-0.003398; 0.001529]
CTAI	LPOP	-0.196421**	0.085764	[-0.364515; -0.028327]
CTAI-FDI	TO	0.001500**	0.000742	[0.000047; 0.002954]
CTAI-FDI	INF	-0.002692***	0.000722	[-0.004108; -0.001277]
CTAI-FDI	INT	0.001089	0.000676	[-0.000236; 0.002414]
CTAI-FDI	OIL	0.000868	0.001446	[-0.001966; 0.003701]
CTAI-FDI	LPOP	-0.145581**	0.072665	[-0.288002; -0.003161]
CTAI-DW	TO	0.002377***	0.000620	[0.001161; 0.003592]
CTAI-DW	INF	-0.003430***	0.000836	[-0.005069; -0.001791]
CTAI-DW	INT	0.001042	0.000897	[-0.000716; 0.002799]
CTAI-DW	OIL	-0.000127	0.001530	[-0.003125; 0.002871]
CTAI-DW	LPOP	-0.115464	0.097213	[-0.305999; 0.075071]

Note: All models use 98 observations; Driscoll–Kraay standard errors are calculated with an HC1 correction and bandwidth 2. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Trade openness is positively associated with the CTAI across all three index constructions. In the main model, a 10-percentage-point increase in trade openness is associated with an approximately 0.0195-point higher CTAI, holding the other regressors and fixed effects constant. Inflation is negatively associated with the CTAI in all three level specifications, but this relationship is not statistically significant in first differences. Internet penetration and oil rents are not statistically significant in the main or alternative index specifications. The coefficient of log population is negative in the main and no-FDI models but not statistically significant in the alternative-weighting model; it should therefore be interpreted cautiously. Because population centers in natural logarithms, the baseline coefficient of −0.196421 corresponds to an approximately 0.00196-point lower CTAI for a 1% higher population, conditional on the other regressors and fixed effects. This is an association, not a causal demographic effect.

Table 7. Sensitivity of main CTAI results to Driscoll-Kraay bandwidth.

Variable	Bandwidth 0	Bandwidth 1	Bandwidth 2	Bandwidth 3	Bandwidth 4
TO	p=0.000106	p=0.000115	p=0.000339	p=0.000603	p=0.000581
INF	p=0.0108	p=0.000313	p=0.000119	p=0.000000193	p=0.000000

INT	p=0.550	p=0.488	p=0.496	p=0.508	p=0.510
OIL	p=0.567	p=0.499	p=0.457	p=0.473	p=0.484
LPOP	p=0.0110	p=0.0191	p=0.0220	p=0.0276	p=0.0296

Note: Coefficients are unchanged across bandwidths. The table reports p-values to show the sensitivity of inference.

4. FIRST-DIFFERENCE ROBUSTNESS

In first differences, annual changes in trade openness remain positively associated with annual changes in all three CTAI measures. Inflation, internet use, oil rents, and population changes are not statistically significant. These results are reported as a robustness check; non-significance in first differences does not establish the absence of a long-run relationship in levels.

Table 8. First-difference estimates with Driscoll-Kraay standard errors.

Index	Variable	Coeff / significance	SE	95% CI
CTAI	ΔTO	0.001588***	0.000589	[0.000434; 0.002741]
CTAI	ΔINF	-0.000547	0.000681	[-0.001881; 0.000787]
CTAI	ΔINT	0.000041	0.000467	[-0.000873; 0.000956]
CTAI	ΔOIL	-0.001207	0.001749	[-0.004635; 0.002221]
CTAI	ΔLPOP	0.066810	0.167697	[-0.261877; 0.395496]
CTAI-FDI	ΔTO	0.001571**	0.000720	[0.0001590; 0.002983]
CTAI-FDI	ΔINF	-0.000555	0.000830	[-0.002183; 0.001072]
CTAI-FDI	ΔINT	0.000795	0.000571	[-0.000324; 0.001914]
CTAI-FDI	ΔOIL	0.000091	0.001839	[-0.003514; 0.003695]
CTAI-FDI	ΔLPOP	0.018648	0.185195	[-0.344334; 0.381631]
CTAI-DW	ΔTO	0.001791**	0.000753	[0.0003150; 0.003267]
CTAI-DW	ΔINF	-0.000624	0.000939	[-0.002464; 0.001217]
CTAI-DW	ΔINT	0.000176	0.000596	[-0.000991; 0.001344]
CTAI-DW	ΔOIL	-0.002063	0.002065	[-0.006110; 0.001984]
CTAI-DW	ΔLPOP	0.207990	0.177129	[-0.139179; 0.555167]

Note: The first-difference models use 87 observations. All five regressors are displayed for each index. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

5. MULTICOLLINEARITY DIAGNOSTICS

The within-transformed VIFs range from 1.067 to 2.067, suggesting that multicollinearity among the transformed explanatory variables is not severe. The high VIFs in the dummy-variable specification therefore do not, by themselves, justify removing any regressor. Nevertheless, slow-moving variables, particularly population, remain difficult to interpret in a short, unbalanced macro-panel.

Table 9. VIF diagnostics.

Variable	VIF with fixed-effect dummies	VIF after two-way within transformation
TO	23.083	1.564
INF	3.471	1.067
INT	45.122	1.492
OIL	25.651	2.067
LPOP	910.270	1.890

Note: High VIFs in the specification with fixed-effect dummies mainly reflect collinearity with country and year effects; VIFs calculated after the two-way within transformation are low.

Panel unit-root analysis is constrained by missing data and the small number of countries. No common balanced period exists for all six variables and all six countries simultaneously. The longest common period is 2009–2019 for the CTAI and 2000–2007 for trade openness. These periods are too short for reliable second-generation panel unit-root testing. For the better-covered variables, CADF statistics were computed and averaged into CIPS-type statistics. Official CIPS p-values were not reported because the available implementation requires tabulated critical values that are not calibrated for N = 6. An exploratory bootstrap calibration did not reject the null hypothesis of a unit root at the 5% level in any configuration. These results are treated as inconclusive, and the level regressions are not presented as evidence of a long-run equilibrium relationship or causality.

Table 10. CIPS-type statistics and exploratory bootstrap p-values.

Variable	Specification	Period	CIPS statistic	p_boot iid	p_boot block3
INF	Constant	2000-2024	-2.1053	0.1875	0.2200
INF	Trend	2000-2024	-2.9959	0.0740	0.0930
INT	Constant	2000-2021	-0.9639	0.8730	0.8665
INT	Trend	2000-2021	-0.9265	0.9825	0.9725
OIL	Constant	2000-2021	-1.7422	0.4030	0.3135
OIL	Trend	2000-2021	-1.9473	0.6745	0.6315
LPOP	Constant	2000-2024	-1.6075	0.5600	0.5845
LPOP	Trend	2000-2024	-3.0414	0.0995	0.1950

Note: Bootstrap p-values are exploratory and are not official Pesaran CIPS p-values; H_0: unit root.

V. DISCUSSION

Based on the six selected MENA countries, the results lead to a slightly different way of interpreting territorial attractiveness. They do not identify a universal determinant, but instead conclude that the relationships between macroeconomic variables and the composite index are sensitive to how the indices are constructed and econometric specification. This interpretation conforms to the multidimensional agenda of Musolino and Kotosz [3] and the OECD [2], which prescribes that no one economic phenomenon can characterise attractiveness in a territory. The differential country rankings with alternative weights also demonstrates that composite indicators should not be regarded as conclusive league tables of the nations.

Of the reconstructed CTAI, trade openness appears to be the most robust positive correlate. Specifically, the main two-way fixed-effects regression shows that conditional on the controls and fixed effects, a 10-percentage-point increase in trade openness is associated with an approximately 0.0195 points higher CTAI (coefficient = 0.001946; $p < 0.001$). It stays sustainably significant when FDI is omitted in the index and when dimension-based weights are utilized. Although the size and precision of the coefficient are less stable between specifications, it also holds in first differences. This results fairly matches Samir, and Mefteh [30] which study long-run relationship among ICT, transport infrastructure, FDI and economic openness on a panel of 63 countries. This resonates with the OECD [2] view that international engagement is one element of a much wider strategy on how to compete for deterritorialised actors. This study differs from previous studies utilizing a composite outcome (as the dependent variable) and bases on contribution of this outcome. However, the trade coefficient continues to take on significance in the FDI-excluded model, suggesting that this relationship cannot simply be explained by the direct addition of FDI in the CTAI. We acknowledge that reverse causality (or other forms of endogeneity) needs to be ruled out, but this robustness check does not eliminate these potential concerns.

Because the CTAI includes empirically founded economic indicators and many variables are expressed in relation to GDP, some of the estimated associations may only partially reflect conceptual overlap or common-denominator effects. By excluding FDI from the index, the potential for one direct cause of overlap

is reduced; however, it does not eliminate those concerns altogether. They should be interpreted as conditional associations, not independent causal effects.

As a result, inflation is bad related to the CTAI in the level specifications (main model: −0.002201). The overall negative relationship is robust for both alternative index specifications. In contrast, the first-difference models indicate that annual variation inflation and the CTAI are not statistically significantly related. This evidence supports a conditional link only in levels but does not establish causation or long-run relationship. This finding is in contrast to that of Abid (whereas see [28] who finds no statistically significant impact of inflation on international tourist arrivals to the MENA countries. The difference is not necessarily inconsistent, because both studies investigate different outcomes: tourist arrivals in Abid [28] and a composite index in this study. These findings lend support to the idea that macroeconomic stability is one of several territory-attractiveness strategies but that mechanisms still need to be explored.

In the main model, no-FDI model, alternative-weighting model and first-difference specifications show that internet penetration is also insignificant for KIBS (coefficients all positive; $p = 0.496$). Our result contrasts with findings in [28, 30] where relationships are found between ICT, FDI, openness and tourism. Some differences in sample composition, outcome definition, as well as the use of country and year fixed effects, or more remaining within-country variation may account for this discrepancy, but these explanations have not been tested explicitly. You should therefore not take the present results to mean that digital infrastructure does not matter. On the other hand, its additive link with the synthetic CTAI is not precisely assessed in these specifications.

As for oil rents, they attain insignificant coefficients in both the main and alternative specifications. This finding is consistent with the territorial-capital perspective of Camagni and Capello [18], which focuses more on the composition and utilization of territorial assets than on resource endowments. In contrast, in our current models we do not directly test whether governance, diversification or infrastructure moderates the resources rents-attractiveness relationship. Similarly, the log population coefficient is negative and statistically significant in both main and no-FDI level specifications (Tables 6 and 8), but is not significantly different from zero under alternative weighting or first differences. Therefore, the results do not prove (i) that larger populations reduce territorial appeal or (ii) that to be congestion-prone is a common feature of large countries. The log population coefficient captures demographic scale or slow-moving structural features, or other unobserved dimensions of equilibrium provision. Because it is sensitive, it requires more theory and empirical work.

The alternative-weighting exercise also exposes sensitivity within the CTAI itself. Indeed, we have a Pearson correlation of 0.782 (main and dimension-weighted indices) and a Spearman correlation of 0.718 - your typical power supply comparison in the mid end segment. The rankings of countries also shift too: Qatar is first under the equal indicator weights while Jordan ranks 1st with respect to score using equal dimension weights. This supports the sensitivity analysis by OECD [31], and highlights that one set of weights cannot be seen as uniquely correct. The robustness of the econometric results is higher for trade openness than for the other covariates but such stability cannot be interpreted as causality. Our panel is small (only 7 cross-sections) and unbalanced but the diagnostic tests reveal cross-sectional dependence, serial correlation and heteroskedasticity. In addition, unit-root evidence is ambiguous and a long-run equilibrium relationship remains elusive. The results should, therefore, be seen as conditional statistical associations rather than causal effects or established long-run relationships.

VI. CONCLUSION

This paper is with an aim to reconstruct a Composite Territorial Attractiveness Index for six sampled MENA (Middle East and North Africa) countries over 2000–2024 and analyse the possible associations with trade openness, inflation, internet penetration, oil rents and population. The approach is intended to enhance the transparency of index construction by documenting data sources, indicator definitions and normalization, weighting, and missing-data treatment. It further investigates sensitivity of results to different weighting and exclusion of FDI.

The key empirical result shows that trade openness has a positive effect on territorial attractiveness in the three index constructions and first-difference specifications. In the levels, inflation has inverse relation with the CTAI and it is not statistically significant in annual changes. In the estimations, Internet penetration and oil rents never turn out significant whereas the negative population coefficient is sensitive to index construction and econometric specification. These are conditional associations and not causal effects.

The implication from the findings is that external integration should be based on wider territorial-development strategy. Some areas of policy priority could be trade facilitation, customs efficiency, logistics and transport connectivity, as well as backing for companies in entering regional and international markets. Nevertheless, the estimated relationship does not imply that trade liberalisation alone will increase the CTAI; institutional and productive-capacity reforms are still important factors to take into account. The negative relationship between inflation and CTAI levels confirms also the priority on macroeconomic stability. A more predictable economic environment, effecive frameworks simplifying regulations and reducing uncertainties may facilitate the same effect in terms of attracting investment and facilitating economic activity. However, the insignificance of first differences means this paper cannot quantify the benefits to a given target or map out an avenue for causation.

The absence of statistical significance concerning internet penetration does not mean that digital development should be removed as a policy priority. Digital strategies have to go upstream from access, however into service quality, affordability and availability of digital skills (not just tech), adoption by firms, or effective production use of digital technologies. This wider viewpoint accords with the OECD framework [2] as well as the literature on both ICT and FDI or tourism [28, 30]. Likewise, the small oil-rent coefficient does not imply that resource revenues are not relevant for territorial attractiveness. The Tentative Suggestions: Beyond the internationalisation of the economy (the diversification; investing in human capital; developing infrastructure; building institutional capacity to improve governance; and managing resource-revenue wisely all are still, or rather remain relevant options). Population results are also consistent with the policy implications of reducing population. Instead, they highlight the importance of more research on urban planning and public-service capacity as well as territorial governance.

Several limitations should be acknowledged. First, the analysis focuses only on six MENA countries and results cannot be directly extrapolated to a broader context. Second, the missing observations are treated in a complete-case manner: 111 country-year observations remain for the CTAI and additionally only 98 observations remain for the common regression sample. This includes only first-difference models, which use 87 observations. Such limited and often uneven coverage may compromise statistical precision and cross-country comparability. Third, the nature of comparison among indicators (for example. orientation/normalization), and between countries (for example. weighting) means that CTAs will rank countries differently in different contexts; our alternative-weighting exercise shows that a country ranking is not fully invariant across methods. Fourth, the reduced-form panel specification does not address reverse causality, omitted-variable bias or measurement error. Last but not least, the short sample period, poor covering of the time span and inconclusive unit-root results block to identify a cointegration relationship for ever Similarly, our application of alternative index constructions and complete-case samples suggests that the results may continue to be sensitive to index specification and mechanisms of missing data.

Future research could improve geographic spread and data availability. Some further domains to investigate are different normalizations and aggregation techniques, testing model sensitivity to single components, differentiating potential attractiveness from realized flows more clearly, etc. What national averages conceal, disaggregated data can reveal: those inequalities that occur regionally. Econometric extensions that would include cointegration or dynamic-panel methods (where the data allow) and appropriate identification strategies to deal with endogeneity would be state-of-the-art. There were no additional references to work that could delve into the differential effects on MENA economies of openness, governance, digital development and resource dependence.

In conclusion, this paper adds transparency to a multidimensional measurement framework & that correlates of territorial attractiveness vary with the index construction and econometric specification. Once

again, this sample does not allow us to unpack a globally ordered hierarchy of determinants though trade openness again seems the strongest positive correlate across leads.

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Author Contributions

Conceptualization, O.C. and F.Z.F.; methodology, A.S.; software, D.E.I.; validation, O.C., F.Z.F., and A.S.; formal analysis, A.B.T.; investigation, F.Z.F.; resources, M.B.; data curation, M.B.; writing—original draft preparation, O.C.; writing—review and editing, A.S.; visualization, D.E.I.; supervision, M.B. and A.B.T. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data supporting the reported results is available from the author upon request.

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